AMENDMENTS TO THE CLAIMS:

Please amend claims 1, 3, 4, 13-15, 19-25, 27-29, 31, 33, 35 and 36 as follows.

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) An optical waveguide structure comprising:

a core layer having a first refractive index n_{core},

an array of sub-regions within the core layer, said core layer sub-regions having a second refractive index n_{rods}, the array of sub-regions extending longitudinally along the waveguide and ~~giving rise to~~comprising a photonic band structure which is experienced by an optical mode travelling through the waveguide structure, and

a cladding layer adjacent to the core layer, said cladding layer having a refractive index $n_{cladding}$, wherein:

$n_{core} > n_{rods}[[\exists]] \geq n_{cladding}$ and $n_{core} - n_{rods} > 0.1$, wherein said cladding layer includes a plurality of sub-regions, said cladding layer sub-regions are contiguous with said core layer sub-regions.

2. (original) An optical waveguide structure according to claim 1, wherein the array of sub-regions gives rise to a photonic bandgap.

3. (currently amended) An optical waveguide structure according to claim 1, wherein the waveguide structure is a planar waveguide structure, the planar waveguide structure further ~~including~~comprising a buffer layer having a refractive index n_{buffer}, wherein the core layer is ~~positioned~~located between the buffer layer and the cladding layer and wherein:

$n_{core} > n_{rods}[[\exists]] \geq n_{buffer}$.

4. (currently amended) An optical waveguide structure according to claim 1, wherein the waveguide structure is an optical fibre structure, the cladding layer is an annular layer surrounding the core layer.

5. (original) An optical waveguide structure according to claim 1, wherein the core layer has a refractive index between 1.4 and 4.

6. (original) An optical waveguide structure according to claim 1, wherein the sub-regions have a refractive index between 1.3 and 1.6.

7. (original) An optical waveguide structure according to claim 1, wherein the cladding layer has a refractive index between 1.3 and 1.6.

8. (original) An optical waveguide structure according to claim 3, wherein the buffer layer has a refractive index between 1.3 and 1.6.

9. (original) An optical waveguide structure according to claim 1, wherein the sub-regions are formed from silicon oxynitride or silicon dioxide.

10. (original) An optical waveguide structure according to claim 1, wherein the core layer is formed from silicon nitride, doped silica, tantalum pentoxide or doped tantalum pentoxide.

11. (original) An optical waveguide structure according to claim 1, wherein the cladding layer is formed from silicon dioxide.

12. (original) An optical waveguide structure according to claim 3, wherein the buffer layer is formed from silicon dioxide.

13. (currently amended) An optical waveguide structure according to claim 1, wherein the cladding layer sub-regions extend through the cladding layer and the core layer sub-regions extend through~~as well as~~ the core layer.

14. (currently amended) An optical waveguide structure according to claim 3, further comprising a plurality of sub-regions in said buffer layer, wherein the buffer layer sub-regions ~~extend partially or fully into the buffer layer~~are contiguous with said core layer sub-regions.

15. (currently amended) An optical waveguide structure according to claim 1, wherein the cladding layer ~~includes~~ sub-regions ~~corresponding to the sub-regions in the core layer having~~ have a refractive index which is greater than ~~or equal to~~ the refractive index of the cladding layer but which is less than or equal to the refractive index of the core layer sub-regions ~~in the core~~.

16. (original) An optical waveguide structure according to claim 1, wherein the core layer includes a lateral waveguiding region having no sub-regions.

17. (original) An optical waveguide structure according to claim 16, wherein the waveguiding region includes a waveguide bend.

18. (original) An optical device including an optical waveguide structure according to claim 1.

19. (currently amended) A method of manufacturing a optical waveguide structure comprising the steps of:

providing a core layer having a first refractive index n_{core};

providing an array of sub-regions within the core layer, said sub-regions having a second refractive index n_{rods}, the array of sub-regions extending longitudinally along the waveguide and ~~giving rise to~~comprising a photonic band structure which is experienced by an optical mode travelling through the waveguide structure; and

providing a cladding layer adjacent to the core layer, said cladding layer having a refractive index $n_{cladding}$; wherein:

$n_{core} > n_{rods}$ [[$\exists$]]$\geq n_{cladding}$ and $n_{core}-n_{rods} > 0.1$, wherein said cladding layer includes a plurality of sub-regions, said cladding layer sub-regions are contiguous with said core layer sub-regions.

20. (currently amended) A method according to claim 19, wherein the optical waveguide is planar, the method further including the step of providing a buffer layer having a refractive index n_{buffer} on the opposite side of the core layer to the cladding layer, wherein:

$n_{core} > n_{rods}$[[$\exists$]]$\geq n_{buffer}$.

21. (currently amended) A method according to claim 19, wherein the optical waveguide is an optical fibre, the method further including the steps of:

providing the cladding layer as an annular layer surrounding the core layer.

22. (currently amended) A method of guiding an optical signal ~~comprises~~comprising the step of passing an optical signal through a waveguiding region of an optical waveguide structure, said structure comprising:

a core layer having a first refractive index n_{core},

an array of sub-regions within the core layer, said sub-regions having a second refractive index n_{rods}, the array of sub-regions extending longitudinally along the waveguide and ~~giving rise to~~comprising a photonic band structure which is experienced by an optical mode travelling through the waveguide structure, and

a cladding layer adjacent the core layer, said cladding layer having a refractive index $n_{cladding}$, wherein:

$n_{core} > n_{rods}[[\exists]] \geq n_{cladding}$ and $n_{core} - n_{rods} > 0.1$, wherein said cladding layer includes a plurality of sub-regions, said cladding layer sub-regions are contiguous with said core layer sub-regions.

23. (currently amended) A method according to claim 22, wherein the optical waveguide structure is a planar structure, said planar waveguide structure further ~~including~~comprising a buffer layer having a refractive index n_{buffer}, wherein the core layer is ~~positioned~~located between the buffer layer and the cladding layer and wherein:

$n_{core} > n_{rods}[[\exists]] \geq n_{buffer}$.

24. (currently amended) A method according to claim 22, wherein the waveguide structure is an optical fibre structure, wherein the cladding layer ~~surrounds~~is an annular layer surrounding the core layer.

25. (currently amended) An optical waveguide structure comprising:

a core layer having a first refractive index n_{core}, ~~and~~

a 2-dimensional array of sub-regions within the core layer, said array of sub-regions having a second refractive index n_{rods}, the array of sub-regions extending longitudinally along the waveguide and ~~giving rise to~~comprising a photonic band structure within the core layer, and

a cladding layer adjacent the core layer, said cladding layer having a refractive index $n_{cladding}$ wherein:

$n_{core} > n_{rods}[[\exists]] \geq n_{cladding}$, wherein said cladding layer includes a plurality of sub-regions, said cladding layer sub-regions are contiguous with said core layer sub-regions.

26. (original) An optical waveguide structure according to claim 25, wherein $n_{core} - n_{rods} > 0.1$.

27. (currently amended) An optical waveguide structure according to claim 25, wherein the waveguide structure is a planar waveguide structure, further including a

buffer layer, the core layer being formed between the cladding layer and ~~a~~said buffer layer, the buffer layer having a fourth refractive index n_{buffer}, wherein:

$n_{core} > n_{rods}[[\exists]] \geq n_{cladding}$ and n_{buffer}.

28. (currently amended) An optical waveguide structure according to claim 25, wherein the waveguide structure is an optical fibre, and the cladding layer ~~having~~comprises an annular layer surrounding the core layer.

29. (currently amended) A method of manufacturing a optical waveguide structure comprising the steps of:

providing a core layer having a first refractive index n_{core};

providing a cladding layer adjacent to the core layer, said cladding layer having a refractive index $n_{cladding}$;

forming a 2-dimensional array of holes in the core layer extending longitudinally along the waveguide structure;

filling the holes with a material having a second refractive index n_{rods}, wherein:

$n_{core} > n_{rods}[[\exists]] \geq n_{cladding}$, said cladding layer includes a plurality of sub-regions, said cladding layer sub-regions are contiguous with said holes.

30. (original) A method according to claim 29, wherein $n_{core} - n_{rods} > 0.1$.

31. (currently amended) A method according to claim 29, wherein the optical waveguide is a planar waveguide, the method further including the steps of:

providing a buffer layer having a refractive index n_{buffer} on the other side of the core layer ~~to~~from the cladding layer; wherein:

$n_{core} > n_{rods}$ [[∃]]≧ $n_{cladding}$ and n_{buffer}.

32. (previously presented) A method according to claim 29, wherein the optical waveguide is an optical fibre, the method including the step of:

providing the cladding layer surrounding the core layer.

33. (currently amended) A method of guiding an optical signal comprising the step of passing an optical signal through a waveguiding region of an optical waveguide structure, said waveguide structure comprising:

a core layer having a first refractive index n_{core},

a 2-dimensional array of sub-regions within the core layer extending longitudinally along the waveguide having a second refractive index n_{rods}, the array of sub-regions ~~giving rise to~~comprising a photonic band structure within the core layer, and

a cladding layer adjacent to the core layer, said cladding layer having a refractive index $n_{cladding}$, wherein:

$n_{core} > n_{rods}$[[∃]]≧$n_{cladding}$, said cladding layer includes a plurality of sub-regions, said cladding layer sub-regions are contiguous with said core layer sub-regions

34. (original) A method according to claim 33, wherein $n_{core} - n_{rods} > 0.1$.

35. (currently amended) A method according to claim 33, wherein the waveguide is a planar waveguide, further including a buffer layer, wherein the core layer is formed between the cladding layer and ~~a~~said buffer layer, the buffer layer having a fourth refractive index n_{buffer}, and wherein:

$n_{core} > n_{rods}$[[∃]]≧ $n_{cladding}$ and n_{buffer}.

36. (currently amended) A method according to claim 33, wherein the optical waveguide is an optical fibre, wherein the cladding layer is an annular layer surrounding~~surrounds~~ the core layer.